

Additionally, Komatsu et al. describes that the polymer composition is preferable to be an interpenetrating type polymer composition wherein the hydrolyzate and the readily decomposable resin are intertwined at a molecular chain level.

Also, it describes that the readily decomposable resin is preferable to be a resin resolved or emitted by treating with heat at lower temperature than 500°C or irradiating with ultraviolet, infrared ray, electron beam, X-ray or oxygen plasma (for example, cellulosic resin, polyamide resin, polyester resin, acrylic resin, polyether resin, polyolefin resin, polyol resin, epoxy resin and the like).

Namely, the invention described in Komatsu et al. includes "the polymer composition comprising hydrolyzate of the alkoxysilane and/or halogenated silane and the readily decomposable resin" in the coating film.

In contrast, the present invention relates to "an amorphous silica-based coating film with a low dielectric constant having (i) a silicon compound (hydrolysate) obtained by hydrolyzing tetraalkyl ortho silicate (TAOS) and alkoxysilane (AS) expressed by the general formula $\text{X}_n\text{Si}(\text{OR})_{4-n}$ in the presence of tetraalkyl ammonium hydroxide (TAAOH) which does not substantively include impurities comprising compounds of alkali metal elements and halogen group elements; and (ii) the tetraalkyl ammonium hydroxide (TAAOH)".

However, Komatsu et al. neither describes nor suggests the coating film having the silicon compound and tetraalkyl ammonium hydroxide (TAAOH).

Also, the Examiner held that the Komatsu et al. describes (1) the coating film having the tetraalkyl ortho silicate (general formula (I)) and chlorosilane (general formula (II)); and additionally that (2) chlorosilane is used but the alkoxysilane is not used, and that the cited reference 2 (Raman) describes that

chlorosilane is functionally equal to the alkoxysilane. However, it seems that the examiner has widely misunderstood the content of Komatsu et al.

First, tetraalkyl ortho silicate (TAOS) is a type of alkoxysilane, and it corresponds to general formula $X_n\text{Si}(\text{OR})_{4-n}$ with $n=0$. Also, in the embodiments 1-5 of Komatsu et al., the usage of alkoxysilane (triethoxysilane, methyltrimethoxysilane and the like) is clearly specified.

Incidentally, in the present invention, halogenated silane is not used as an ingredient for obtaining the silicon compound.

Therefore, the coating film of the present invention and the coating film of Komatsu et al. differ substantially in composition. As stated above, even if a part of the ingredient is described in the heretofore known patent publication, since the composition included in the coating film which is ultimately obtained differs completely, the present invention can not be made.

b) Raman et al.

Raman et al. discloses a "Molecular Sieving Silica Membrane Fabrication Process", and also describes that a molar ratio of TEOS/MTES used as the ingredient is in a range from 90/10 to 45/55 (Fig. 3).

However, Raman et al. neither has any description nor suggestion of hydrolysis of TEOS and MTES in the presence of "TAAOH" which is an essential component of this invention. Also, technical ideas forming the present invention are completely different.

Therefore, because the molar ratio of the TEOS/MTES described in Raman et al. overlaps the molar ratio specified in this invention does not mean that the present invention can be easily obtained.

c) Senderov et al.

Senderov et al. discloses a method for manufacturing a titanium-silicate molecular sieve by (a) a process of reacting silica sources and an organic structure directing agent; (b) a process of combining an obtained activated silica solution and titanium sources; (c) a process of ageing and pretreating an obtained titanium-silicate solution; (d) a process of crystallizing the obtained titanium-silicate solution; (e) a process of separating obtained titanium-silicate crystals; and (f) processes of cleaning, drying and sintering the obtained titanium-silicate crystals.

Additionally, Senderov et al. describes that the silica sources are preferably silica gel, precipitated silica, silica sol, fumed silica or the above mixture, and that an organic structure directing agent is preferably a quaternary ammonium compound such as tetrapropyl ammonium hydroxide (TPAOH) or tetrabutyl ammonium hydroxide (TBAOH) and the like.

Also, as the Examiner points out, the paragraph [0043] in the specification describes that "Hydroxides of those cations are preferable because, in addition to their SDA function, they provide a source of alkalinity. It is known in the art that many other base materials are effective in dissolving silica, but tetrapropyl ammonium hydroxide (TPAOH) and tetrabutyl ammonium hydroxide (TBAOH) are preferred in the methods of the present invention because they are bases which are not only hydrolyze and depolymerize silica, but direct the crystallization process towards formation of particularly desirable MFI-type and MEL-type, respectively, molecular sieve products."

However, the above paragraph describes that the TPAOH and TBAOH do not only include the function to dissolve the silica sources (all the illustrated examples are in the form of SiO_2), but are useful for forming the molecular sieve products including an

MFI-type or MEL-type crystal structure in the crystallization process. More specifically, the TPAOH and TBAOH are used for the purpose of obtaining the titanium-silicate solution by reacting the silica sources and the titanium sources; and crystallizing the titanium-silicate.

In contrast, in the present invention, the tetraalkyl ammonium hydroxide (TAAOH) is used for the purpose of improving (1) a catalyst effect at the time of preparation of the coating film; and (2) a template effect at the time of formation of the coat. Also, the TAAOH used in the present invention is highly purified by removing the impurities such as the compound of alkali metal elements or halogen group elements and the like in order not to crystallize the hydrolysate of the tetraalkyl ortho silicate (TAOS) and alkoxysilane (AS).

Also, the present invention does not use silica sources (i.e. silica gel, precipitated silica, silica sol, fumed silica and the like) as shown in the examples of Senderov et al.

Therefore, the purpose of the use and function of tetraalkyl ammonium hydroxide (TAAOH) described in the present invention are entirely different from those of Senderov et al.

d) Taguchi et al.

Taguchi et al. discloses (1) a method for purifying aqueous solution of tetraalkylammonium carbonate and/or tetraalkylammonium hydrogen carbonate by contacting with chelate resin and cation-exchange resin including aminomethylenephosphonic acid radical or iminodiacetic acid radical; and (2) a method for obtaining tetraalkylammonium hydroxide aqueous solution from a cathode chamber by inserting the aqueous solution of the tetraalkylammonium carbonate and/or tetraalkylammonium hydrogen carbonate into an anode chamber of an electrolysis tank divided by a cation exchange membrane, and carrying out electrolysis.

Namely, Taguchi et al. only discloses (1) the method for purifying the aqueous solution of tetraalkylammonium carbonate and/or tetraalkylammonium hydrogen carbonate by using the special chelate resin and cation-exchange resin; and (2) the method for obtaining tetraalkylammonium hydroxide by carrying out the electrolysis of the above-mentioned compound inside the electrolysis tank.

In contrast, the present invention is a method for substantively removing the alkali metal elements and halogen group elements included as the impurities in a commercially-produced tetraalkyl ammonium hydroxide by processing the commercially-produced tetraalkyl ammonium hydroxide with the cation-exchange resin and an anion-exchange resin before being used as an ingredient of a coating film preparation.

Therefore, the method used in this invention substantially differs from the method described in Taguchi et al.

e) Burger et al.

Burger et al. discloses a composition having (1) alkyltrialkoxysilane, (2) alkoxysilane and/or tetra-alkoxysilane, (3) water-containing silica sol, (4) acid, and (5) alcohol and/or glycol higher than flash point 21° C.

Also, as the Examiner pointed out, the paragraph [0011] in the specification describes that "Since effective filming and adhesion of the coating require the addition of further solvents, the solids content of the coating compositions is often relatively low as well, usually less than 35% by weight."

However, Burger et al. neither describes nor suggests the hydrolyzing of the TEOS and MTES in the presence of the "TAAOH" which is the essential component of this invention. Also, technical ideas structuring these inventions completely differ.

2. Patentability of the Present Invention

It is very important in the present invention (1) usage of tetraalkyl ammonium hydroxide which does not substantively include impurities comprising alkali metal elements and halogen group elements; and (2) leaving tetraalkyl ammonium hydroxide added at the time of preparation of the coating film inside the coating film as it is.

Namely, the present invention relates to the "amorphous silica-based coating film with a low dielectric constant having (i) silicon compound (hydrolysate) obtained by hydrolyzing tetraalkyl ortho silicate (TAOS) and alkoxysilane (AS) expressed by the general formula $X_nSi(OR)_{4-n}$ in the presence of the tetraalkyl ammonium hydroxide (TAAOH) which does not substantively include impurities comprising alkali metal elements and halogen group elements; and (ii) tetraalkyl ammonium hydroxide (TAAOH)".

In contrast, as mentioned above, Komatsu discloses the silica-based coating film with the low dielectric constant having the polymer composition consisting of the hydrolysate of the alkoxysilane and/or the halogenated silane. However, Komatsu et al. neither describes nor suggests that "the silicon compound (hydrolysate) and tetraalkyl ammonium hydroxide (TAAOH)" of the present invention are included.

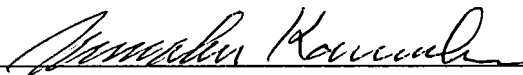
Also, technical fields of other cited references and the present invention are completely different. In addition, the other cited references neither describe nor suggest the coating film comprising the composition of the present invention.

As explained above, claims of the invention are not obvious from the cited references.

Reconsideration and allowance are earnestly solicited.

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Respectfully Submitted,

By 

Manabu Kanesaka

Reg. No. 31,467

1700 Diagonal Road, Suite 310
Alexandria, VA 22314
(703) 519-9785